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DATAMATION

FOR MANAGERS OF INFORMATION TECHNOLOGY WORLDWIDE

Hot Technologies for the New Year!

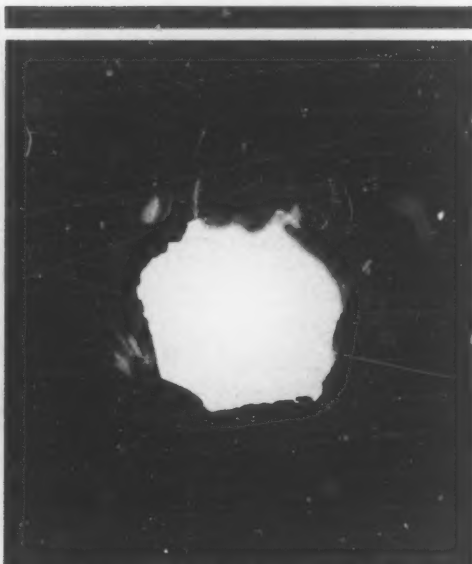
**Expert Systems, LANs,
CASE, and Imaging Systems
Heat Up User Environments**

Also in this Issue:

**The Evolution of Telecom Pros
The Long Road to DB2 Migration
Soft Landings for RISC Systems
Gauging Decision Support Benefits**

DATAMATION[®]

FOR MANAGERS OF INFORMATION TECHNOLOGY WORLDWIDE



Hot Technologies for 1989 18

BY LINDA RUNYAN Expert systems and local area networks are the projects IS execs will feverishly pursue in the year ahead. Capturing expertise in an economical form is the chief motive behind their AI investments, while connecting PCs and workstations to corporatewide systems spurs their LAN purchases. Outlays for imaging systems, optical storage, OLTP applications, and CASE tools are also heating up. Interest in packaged software and IBM's SAA, however, remains lukewarm.

Cover Photography by Walter Wick

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The Long Road to DB2 Migration 29

BY JANETTE MARTIN IBM does not encourage migration from IMS to DB2, but users on both sides of the Atlantic plan to do just that. Although the migration path is tortuous and expensive, products that could make it easier are emerging.

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Soft Landings for RISC Systems 35

BY GARY McWILLIAMS Compared with the transition from 16-bit CISC architectures to 32-bit, the move from CISC to RISC appears to have fewer hurdles. To smooth customers' change to RISC systems, vendors are combining existing Unix OSs and, in some cases, applications.

COMMUNICATIONS

NETWORKS

Take a Letter, Mr. Postman 37

BY BRAD SCHULTZ A movement to interconnect now separate electronic mail systems via X.400 gateways is gathering steam at corporations. Key considerations facing IS managers are multivendor computing environments, deciding between in-house and external e-mail systems, and the impact of IBM's recent announcements.

PERSONNEL

Telecom Pros Evolve 45

BY SUSAN KERR In today's network age, the integration of voice and data demands hiring professionals who have more than just telephone experience. A new breed of telecommunications professional is evolving, and in most cases, he or she is emerging from the computer department.

MANAGEMENT

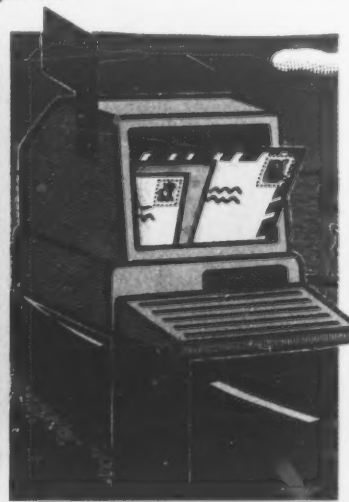
DEVELOPMENT

The Benefit of Quality IS 53

BY EDWARD RIVARD AND KATE KAISER Contrary to popular belief, several methods exist for identifying the intangible, qualitative benefits of today's sophisticated decision support-oriented systems and for presenting their potentially significant impact to management.



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Acting On Intelligence

Timing isn't everything in IS life, but it certainly accounts for a significant number of successes and failures in implementing new technologies. Early adopters of innovative products and techniques often gain ground in market share that competitors find difficult to recapture. Conversely, IS execs who leap uninformed into new, untested technologies usually pay stiff penalties—cost overruns, poor morale, etc.

Technology choices, consequently, carry far greater weight than many other corporate exercises. That's why we turned to senior editor Linda Runyan to head up our annual effort at assessing where leading users in different business segments are putting their technology dollars. Her dozen years at DATAMATION counted heavily when we evaluated the evidence that she and her band of reporters uncovered regarding the application of AI by major user organizations. "You're not going to believe it, guys," Runyan exclaimed after poring over reports from Mary Jo Foley, Michael Leibowitz, and Kurt Rothschild, who had fanned out to determine what IS execs in a dozen industries had on their technology drawing boards for the new year, "but AI is the story for 1989."

For years, AI vendors have been promising that the next growth spurt for their industry was at hand. So, claims that any branch of AI would blossom in 1989 would have been treated skeptically had they come from a lesser known source than Runyan, who has seen many technology plants thrive and die. She finds, however, that AI applications have left the vendors' greenhouses and started to crop up at transportation companies, chemical manufacturers, utilities, oil companies, and insurers.

Despite the endorsement of Norfolk Southern, Combustion Engineering, Southern California Edison, Shell Oil, and other AI users, the technology requires careful and patient management, Runyan cautions. Several of the expert systems users she examines are in the pilot—not production—stage. That's why, she reasons, so few users have put AI outlays into their normal IS budgets for 1989.

Networks, on the other hand, have found their way into the mainstream of corporate information technologies. Networks, along with computer-aided software engineering, imaging systems, and optical storage, hold significant potential for improving office productivity and for creating new business opportunities. All the more reason to warm up to "Hot Technologies for 1989," on page 18.



Photograph by Kevin Kerba

TECHNOLOGY TWEAKER Runyan measures AI stakes in '89.

Technology Transitions Don't Have To Be Hard

Relational database management and reduced instruction set computing, two other technologies of critical importance to companies, are the subjects of two additional articles in this issue.

Corporate data held in relational form will grow from an average of about 7% of all data in 1988 to over 45% by 1993, predicts one industry savant. "The big question," he says, "is how to get there." Our Italy-based correspondent Janette Martin discovers the ways in which at least some European users of IBM's hierarchical database technology are planning to make the trip in "The Long Road to DB2 Migration," on page 29.

Travel of a different sort draws the attention of Boston bureau manager Gary McWilliams in "Soft Landing for RISC Systems," on page 35.

Tim Mead

—Tim Mead, Editor-in-Chief

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What you're seeing now is the swelling of the wave approaching the beach," says Einar Stefferud, a consultant with Network Management Associates, from his office in Huntington Beach, Calif., near the site of the U.S. surfing championships. "A wave of new X.400 products will crest and crash on the beach in 1990."

And it won't be because of the moon and the tides. A number of trends are conspiring to bring about the push for X.400 compliance. Chief among them is usage. Industry estimates show double-digit growth rates for both the number of mailboxes being created and the number of messages being sent per month. Add to this the number of e-mail users employing both internal and public e-mail services, and it's not difficult to see why vendors are flocking to the X.400 standard.

For IS managers with heavy responsibilities for e-mail within and between sizable organizations, the message is clear: you should now be participating in the development of a corporate strategy for implementing an X.400-conformant backbone network.

The first steps in formulating this strategy, say Stefferud and others, is to evaluate what your e-mail needs are and how they are likely to grow. Know the capabilities of the systems you are currently using and determine how much of your existing e-mail traffic is not X.400-conformant.

It may be some comfort to know that virtually all major vendors of products and services that might serve as elements of an e-mail operation have at least formally endorsed X.400, and that some companies already run a significant portion of their e-mail through X.400-conformant networks.

Says Douglas Brackbill, director of MCI Mail's advanced product marketing, "As a standard for exchanging messages between systems, X.400 expedites the interconnection process. It eliminates the need for special development and support for each pairwise interconnection. It provides the platform for worldwide messaging and information interconnection."

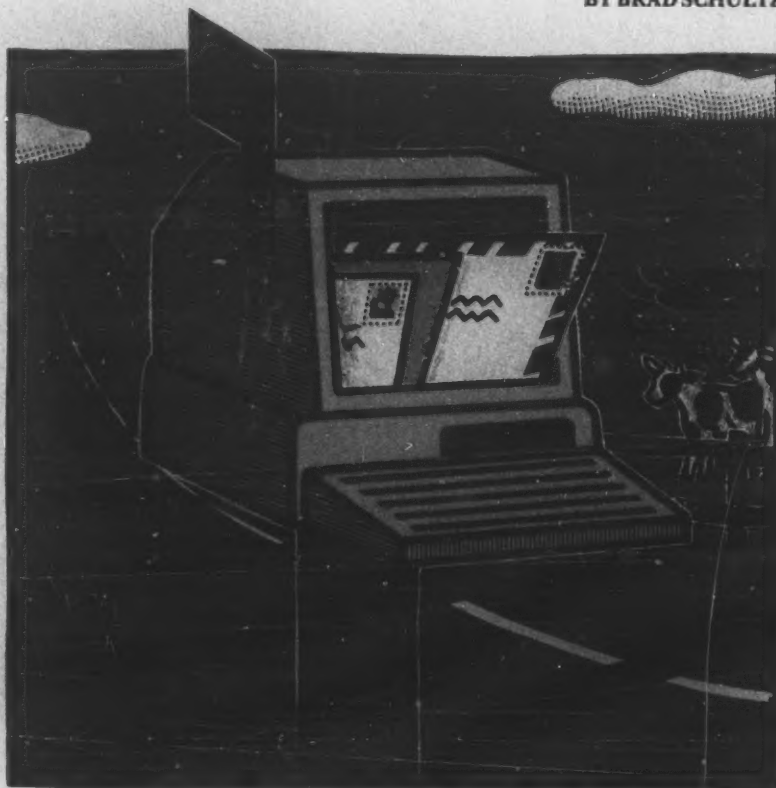
The Role of X.400 Gateways

To interconnect separate, coexisting e-mail systems, commercial companies around the world employ or will employ gateway products and services that translate e-mail from proprietary to other proprietary or X.400 formats. At many companies, X.400 gateways run or will run at the junctions between e-mail resources conformant to X.400 and e-mail resources conformant to a proprietary

Take a Letter, Mr. Postman

A movement to interconnect now separate electronic mail systems via X.400 gateways is gathering steam with IS managers facing several key considerations.

BY BRAD SCHULTZ



☐ X.400 GATEWAYS MAY OBVIATE THE NEED FOR SEPARATE MESSAGE-HANDLING GATEWAYS.

network architecture that is incompatible with X.400.

X.400 gateways may gradually obviate the need for separate message-handling gateways between proprietary network architectures, Stefferud notes. For example,

a company may eliminate gateways between its IBM mainframes and DEC VAX units by configuring an X.400 backbone network from all of these systems, or from some of them, while establishing gateways between the backbone network and systems the network does not include. By minimizing the volume of e-mail that must run through systems not included in its X.400 backbone network, a company may minimize the cost, performance drain, and reliability risks that are imposed

Illustration by Tim Grajek

COMMUNICATIONS

E-MAIL

by gateway utilization.

Analysts say that IBM's announcement last September of products conformant with X.400 and other Open Systems Interconnection (OSI) protocols ensures eventual widespread acceptance of the X.400 approach to e-mail networking by the world's commercial IS community. X.400 is considered the first of several protocol standards for the top layer of the seven-layer OSI model—the application layer, where information services are provided to support end-user tasks such as file transfer, remote file access, database management, and communications between applications.

IBM also made clear its determination to support both Systems Network Architecture (SNA) and X.400 approaches to e-mail by its September announcement of Open Systems Message Exchange (OSME), a software package (scheduled to become available last month in VM and MVS versions) that would route messages between SNA-conformant IBM systems and other vendors' X.400-conformant systems.

At the same time, IBM said that it would make available later this year an enhanced version of its X.400 Interpersonal Message Services (IPMS) that would let IPMS users exchange messages with users of the IBM Information Network's ScreenMail Service.

OSME may be ordered with modules called X.400 PROFS Connection and X.400 DISOSS Connection, which would convert the formats of messages constructed under IBM's Professional Office System (PROFS) and Distributed Office Support System (DISOSS), respectively, into the X.400 message format, and vice versa.

PROFS is the most widely used e-mail system in IBM mainframe environments. While PROFS-involved IS managers say that they are far from satisfied with the aging VM-supported system and want to minimize SNA-dependent e-mail operations, they all say that it and DISOSS will probably be running at their companies well into the 1990s.

Running on an IBM 9370, a program offering called PROFS Extended Mail lets a large California aerospace company exchange messages between SNA environments and the Internet, the world's foremost network of research-oriented computer networks. The Internet was spawned by and is now absorbing ARPANET, where computer-based e-mail began (see "The Evolution of ARPANET," Aug. 1, 1988, p. 71).

Although this aerospace company is "about 60% Big Blue," according to an IS manager who requested anonymity, the

A Sample of Some E-Mail Suppliers

AT&T (AT&T Mail)

55 Corporate Dr.
Bridgewater, NJ 08807-6991
(201) 658-6000
Circle 150

CompuServe

5000 Arlington Centre Blvd.
Columbus, OH 43220
(614) 457-8600
Circle 151

Dialcom Group

6120 Executive Blvd.
Rockville, MD 20852
(301) 881-9020
Circle 152

GE Information Services

401 N. Washington St.
Rockville, MD 20850
(301) 340-4000
Circle 153

McDonnell Douglas (OnTyme)

20705 Valley Green Dr.
Cupertino, CA 95014

(800) 435-8880
Circle 154

MCI international (MCI Mail)

2 International Dr.
Rye Brook, NY 10573-1098
(914) 937-3444
Circle 155

The Source

1616 Anderson Rd.
McLean, VA 22102
(703) 734-7500
Circle 156

Telenet Communications Corp./U.S.

Sprint (Telemail)
12490 Sunrise Valley Dr.
Reston, VA 22096
(703) 689-5700
Circle 157

Western Union (Easylink)

1 Lake St.
Upper Saddle River, NJ 07458
(201) 825-5000
Circle 158

PROFS Extended Mail gateway is crucial because thousands of users in the company, like most Internet users—including major contributors to the development of X.400 and X.400 gateways—depend heavily on SNA-incompatible, Unix-based e-mail systems.

"Our whole strategy with X.400 is to

☐ IBM WILL BE SUPPORTING BOTH SNA AND X.400 APPROACHES TO E-MAIL VIA ITS OSME SOFTWARE.

use it for intercompany e-mail within the aerospace industry," says the IS manager, whose company has about 15,000 e-mail users. "Because X.400 is not proprietary, it does not lock us into any particular vendor." He adds that X.400's scheme for specifying e-mail addresses is advantageous.

The Inadequacy of Eight Characters

IS managers using PROFS tell DATAMATION that the PROFS convention of specifying an e-mail address in terms of just eight characters for a user name and another eight characters for a site name is quite inadequate for their purposes. A primary benefit of PROFS Extended Mail is that it can convert a 16-character PROFS address into an address of the greater length re-

quired in huge networks like the Internet.

"It is a travesty that IBM would ever decide to market [PROFS]," remarks the aerospace company IS manager. He adds, "Of all the major e-mail systems on the market today, PROFS is probably the worst from a user-friendliness standpoint." Yet, he concedes, "there is a lot of functionality in it. If you're willing to put up with the product's user-viciousness, you can get a lot of work done. I couldn't do my job without it."

Vendors, too, are preparing themselves for when the new IBM products become available. According to Miles Morimoto, X.400 product manager for Telemail, the public e-mail service of U.S. Sprint's Telenet Communications Corp., Telemail has been offering a gateway package similar to the X.400 PROFS Connection, but will ensure that Telemail services are fully compatible with that OSME option.

He says that Telemail, through various products and services, has already brought a number of large organizations into X.400 conformance, including Boeing Co., Northrop, the Federal National Mortgage Association, the U.S. Forest Service, NASA, and the postal, telephone, and telegraph authorities of several nations.

However, getting the job done and ensuring conformance has become more complex than ever. Today, the demand of users to interconnect dissimilar systems must be met. One company that has risen

Yes, There Are Many Messages in His Bag for You

U.S. public network e-mail services showed strong growth between 1987 and 1988.

Electronic Mail Service	Active Mailboxes (as of June 1988)	Messages Per Month (in millions)	1987 Total Revenue (in millions)
Western Union (EasyLink)	175,000	7.5	\$83
U.S. Sprint (Telemail)	165,000	4.8	50
Dialcom Group (U.S.)	140,000	3.8	37
CompuServe (InfoPlex & CIS)	450,000	3.3	33
MCI Mail	100,000	1.8	20
GE Information Services (Quik-Comm & GENie)	150,000	1.6	20
AT&T Mail	40,000	1.7	17
McDonnell Douglas (On Tyme)	50,000	1.1	15
The Source	60,000	.25	3
Others	155,000	1.05	9
TOTAL	1,485,000	26.9	\$287
Annual Growth Rates (based on 16-month period from March 1987 to July 1988)			
	16%	25%	20%

NOTE: This table lists the nine largest publicly available electronic mail networks in the U.S. It counts only U.S. subscribers, and therefore does not include Canada, which is an 80,000-user market. Growth rates are for U.S. only. Source: International Resource Development

to that challenge is Hughes Aircraft, a General Motors subsidiary.

At Electronic Messaging '88, the latest annual Electronic Mail Association (EMA) conference, held last October, Hughes IS manager Peter W. Donaghy described how e-mail systems are deployed in multivendor computing environments at his company's 32 locations.

These systems route messages across a packet-switched (X.25) network Hughes Aircraft built for itself, across SNA-conformant networks, across DECnets and Ethernets configured from Digital Equipment Corp. products, and across local area networks supplied by 3Com, Novell, Banyan, and Apple Computer, according to Donaghy. He went on to explain that more than 10,000 of the company's 22,000 e-mail users are served by DEC VMS Mail and All-in-1, running on more than 200 DEC computers. About 7,000 users are served by 10 PROFS implementations.

All of this diversity in proprietary e-mail systems forces Hughes Aircraft to run a lot of message format translations at gateways. According to Donaghy, message-handling gateways between the IBM systems and other e-mail systems perform more than 2,400 translations per month, while gateways between e-mail systems hosted by 15 Hewlett-Packard Co. computers and other e-mail systems translate more than 1,200 messages per month. Gateways between the DEC e-mail systems and other systems translate in excess of 600 messages per month.

Gateways between PC Office, an e-mail system the company developed for itself, and other systems translate more than 780 messages per month, while gateways between MCI Communications' telex service and other systems translate more than 720 messages per month. All told, the number of message translations performed at Hughes Aircraft's gateways exceeds 5,700 and is growing fast, Donaghy said.

The Desire for Interconnection

"It's obvious that organizations using electronic mail have seen an extraordinary boom in usage and a demand from employees across various departmental lines for companywide interconnected messaging," says Michael Cavanaugh,

executive director of the EMA.

"We heard a good deal about the initiatives that are being taken by representative organizations at Electronic Messaging '88," he continues. "Beyond achieving reach within the corporate structure, individuals now want an interconnection to at least one public message-

□ WESTERN DIGITAL IS MOVING TO STANDARDIZE ON A SINGLE SOFTWARE PACKAGE.

ing service to establish communications with suppliers, vendors, consultants, etc., as well as to gain access to telex, hard-copy delivery, terminal-to-fax, etc."

Adds Rhonda Carlson, office automation manager for Western Digital, Irvine, Calif., "On my wish list for 1989 is universal messaging among public e-mail service vendors. The subject of interconnecting messaging systems using X.400 was addressed at the EMA conference. We heard a lot of talk, but have seen little action."

Carlson says that her company is fortunate in being able to standardize on a single computer architecture, DEC VAX, for its e-mail system hosts, and is even moving to standardize on a single e-mail software package, DEC's All-in-1. Despite the extent of its internal standardization,

Western Digital desires tools for interconnecting its e-mail systems with those of the organizations that correspond with the company, she emphasizes.

Before they interconnect various e-mail systems, many organizations have to decide whether to develop their own e-mail service or use a service from an outside source. One expert in the field, former MCI Mail president J. Robert Harcharik, now a semiretired consultant based in Hilton Head, S.C., favors in-house e-mail development.

"They might try e-mail externally for a short time," Harcharik says, "and if it sells inside their organizations, they should go in-house. The economics are overwhelming."

"But here is where the same people really miss the boat," he points out. "They should connect the in-house systems to a service, so that mail can be

transferred between their own in-house systems and between their systems and those of their suppliers, customers, etc. Not to mention that such interconnection would give them telex, overnight courier letters, postally delivered letters, and now fax on every user's desk."

Harcharik stresses the "staggering" advantages and value of interconnected systems. "The ability to communicate with people outside your organization as fluidly as you can with those inside is super," he says. "But folks don't ever think to seek this ability, probably because they couldn't imagine it being there. In fact, all they need to do is connect the in-house system to the carrier service."

"E-mail carriers are the postal service, not the mail room," he continues. "They should carry mail intercompany, not intracompany. Really small businesses have to use a service."

But much to Harcharik's regret, those small businesses haven't realized "the value of being able to send messages via overnight letter, fax, and telex from their PC. They, being small single operators, don't communicate with many people on the same service as they are; therefore, if they miss the ability that systems like MCI can give them to communicate in these other media, they miss the entire reason why someone gave them e-mail."

IS manager John J. Alexander Jr. of the Portland, Maine-based Union Mutual Life Insurance Co., where most employees use

COMMUNICATIONS

E-MAIL

PROFS, also regards the decision to implement in-house or public e-mail as an economic decision.

"When a firm is small [either because it's just starting or is naturally that way], an external source can offer economies of scale," Alexander points out. "As the use grows, the company can do a make-versus-buy analysis and decide when to bring inside."

Adds Alexander, who was once MCI Mail's MIS manager, "This is the course that a number of other services have gone, such as timesharing. It's a natural for e-mail."

Western Digital's Carlson observes, "While intracompany communication is our first priority, we've also recognized the importance of being able to communicate electronically with people outside [the company]. With a software package called VAX Mailgate for MCI Mail, co-developed by DEC and MCI, we will be able to communicate with our customers, business partners, and vendors via MCI's public network without compromising the security of our own system."

Apart from the logistics of in-house ver-

sus external e-mail systems, the use of this service can provide important benefits for organizations. One of the claims that is most often advanced is increased productivity.

"E-mail has tremendous potential for improving end-user productivity," says Carlson. She offers an example: "One of

BOEING'S CUSTOMERS REQUIRE IT TO MAINTAIN CONTINUOUS E-MAIL COMMUNICATIONS.

our immediate goals is to develop an application to issue quarterly earnings releases electronically. Today, our mailing list exceeds 500 recipients. Rather than generating 500 signature-stamped letters, a single letter can be produced and delivered to any postal address in the world by using company letterhead with signature. This is just one of many potential applications."

Boeing Aerospace's customers, including the U.S. Defense Department, make it a condition of their contracts that the

company maintain continuous e-mail communication links with them, says e-mail project leader Darrell S. Corbin. Consequently, his company's end users are generally well aware that their e-mail systems are important and powerful resources. Boeing Aerospace provides various programs and services for employee e-mail training. Corbin's work team, charged with interconnecting disparate e-mail systems as necessary, works very closely with Boeing Aerospace's corporate MIS department.

"E-mail systems start with the users and their applications," says MCI Mail's Brackbill. "It's useful to begin by identifying internal departments/users with a strong need to communicate both internally and externally."

Brackbill advises IS managers to "understand their traditional modes of communication and the improvements desired—speed, convenience, productivity, competitive advantage, etc.—as well as their level of computer automation."

Brad Schultz is a freelance writer based in New York.

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